



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, PORTLAND DISTRICT
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REPLY TO
ATTENTION OF

Programs, Planning and
Project Management Division

Ms. Nina Bell
Executive Director
Northwest Environmental Advocates
PO Box 12187
Portland, OR 97212-0187

Dear Ms. Bell:

This letter is in response to your comment letter, dated March 3, 2003, with regards to the Final Supplemental Integrated Feasibility Report and Environmental Impact Statement for the Columbia River Channel Improvement Project.

Your concerns have been addressed in the attachment in a side-by-side format, Final SEIS and in responses to your earlier comments. The remainder have been addressed through the receipt of the 401 Water Quality Certification from the Department of Environmental Quality and Washington Department of Ecology (WDOE) the Coastal Zone Management (CZM) consistency determination from the Oregon Department of Land Conservation Division and WDOE, as well as through project modifications made as a result of those approvals (e.g., deletion of Miller-Pillar ecosystem restoration feature) and implementation of programs identified in those approvals (e.g., Regional Sediment Management). As you know, the State of Washington issued similar Water Quality and CZMA approvals. Copies of state approvals for Water Quality and CZM are available on the Corps' web site at <https://www.nwp.usace.army.mil/issues/CRCIP/pubs.htm>

Thank you for taking the time to comment on the Columbia River Channel Improvement Project.

Robert E. Willis
Chief, Environmental Resources
Branch

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as

NORTHWEST ENVIRONMENTAL ADVOCATES



March 3, 2003

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**Re: Final Supplemental Environmental Impact Statement (FSEIS) for the
Proposed Channel Deepening Project**

Dear Mr. Willis:

- a. The fundamental problem with the FSEIS, and the underlying EISs and EAs associated with O&M dredging of the river channel and the Mouth of the Columbia River (MCR), is the Corps' belief that it need only cite to any number of excuses for its failure to adequately meet the requirements of NEPA. These excuses for its failing to rely on data or analysis include: the Corps' long-held beliefs, the Corps' experience (national and regional), consultation with the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (USF&WS), previous documents that fail to address issues, studies that have not yet been concluded, vague and misleading references to casual pseudo-scientific processes such as that conducted by the Sustainable Ecosystems Institute (SEI), and conjecture. In other words, the Corps believes that it can cite to a black box in which it has drawn a conclusion and the mere existence of this box will satisfy the demands of NEPA and other statutory requirements. We disagree.

Accordingly, we continue to believe that the NEPA analysis is inadequate as it relies on an unclear and as yet established set of standards, principles, objectives, and measurements that constitute an alleged adaptive management scheme, which relies on a monitoring scheme that has yet to be established. This type of black box into which the public is precluded from seeing is not sufficient to constitute compliance with NEPA requirements. Likewise, the promise that some future implementation plan for adaptive management will be posted on the Corps' website is not consistent with NEPA requirements.

I. The Corps Has Failed to Evaluate Cumulative Effects as Required by NEPA

- b. The Corps states its belief that its existing discussion of the status of the environment is sufficient to constitute an analysis of the cumulative impacts of all past, present, and reasonably foreseeable future actions and the overall impact that can be expected if the individual impacts are allowed to accumulate. We disagree. Merely outlining some habitat losses, for example, is not the equivalent of an analysis of the cumulative impact of those losses, in addition to pollution, flow manipulation, and other anthropogenic harms to the river system. For example, such discussions do not evaluate the existing effects on the

- a. Your comments are noted. Detailed responses are provided below.

- b. This comment mischaracterizes the discussion of cumulative effects in Section 6.12 of the FSEIS. Section 6.12 focuses on effects that are important issues of national, regional, or local significance and on actions that potentially affect the same resources as the Channel Improvement Project. Section 6.12 includes information specifically requested by NEA, as well as other stakeholders that commented on the Draft SEIS.

The cumulative effects of changes on salmon was explicitly considered in the Biological Assessment and the NOAA Fisheries Biological Opinion. Each of these documents is incorporated by reference in the FSEIS. Section 6.12 itself analyzes cumulative effects to salmon and other aquatic resources (see pages 6-67, 6-68, 6-81, 6-83, 6-88). The cumulative effects analysis does not focus specifically on sturgeon because the impacts of the project to sturgeon are not anticipated to be significant and there was not significant controversy or concern expressed. Other actions, such as the hydro power system and MCR have affected sturgeon. For example, the dams have affected upstream and downstream migration. Sturgeon have also been observed spawning in the tail race of the dams, although it is not known if there is more spawning in these areas than existed before the dams. Sturgeon also are present in the MCR area. Entrainment studies, however, have not entrained any sturgeon. Again the impacts of the Project are not expected to be significant, and the Project as conditioned by Washington and Oregon includes adaptive management and mitigation measures for the protection of sturgeon.

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Printed on 100% post-consumer recycled, non-toxic, non-halogenated paper

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status of such species as salmonids, white sturgeon and green sturgeon; it does not address the incremental additional risks those species can or cannot tolerate.

II. The Corps Has Failed to Provide Adequate Mitigation for Short and Long-Term Project Impacts

- c. In response to many comments, the Corps reiterates its belief that the proposed co-called restoration actions are not mitigation. We agree that this is the Corps' intent. We disagree that mitigation, beyond the little that is proposed in the FSEIS, is not required. The federal project of constructing and maintaining a deeper river channel have large-scale impacts on the river and coastal environments, on commercial and recreational fishing and shellfishing industries, and on the estuary environment that require mitigation.

III. The Corps Does Not Have Sufficient Scientific Data Upon Which to Base the FSEIS and Arbitrarily Ignores and Rejects the Scientific Analysis of Other Scientists

- d. The Southwest Coastal Erosion Project has concluded: "The volume of dredged material placed at the mouth of the Columbia River is large compared to long-term changes in the tidal-delta complex." [http:// www.ecy.wa.gov/programs/sea/swces/research/sediment_budget.htm](http://www.ecy.wa.gov/programs/sea/swces/research/sediment_budget.htm). We believe that this statement means the Corps' activities are a dominant factor in littoral sand transport. The Corps, however, has taken the position that none of its activities, in particular dredging and dredged material disposal, have an effect sufficient to merit a full response or analysis.

A. The Corps Has Insufficient Bathymetry Data, Has Made Inadequate Sediment Evaluations of Side Slope Areas Likely to Erode, & Has Planned Inadequate and Unstated Monitoring

- e. The FSEIS is based on insufficient bathymetric surveys throughout the project area. Such surveys are required to assess habitat and morphological changes in the river. For example, such studies are needed to assess whether there has already been erosion of and/or accretion in shallow water habitats in the estuary and to better understand sediment transport mechanisms. The last full bathymetric survey was done in 1958 and demonstrated that accretion in the estuary is likely the result of high river flows in the period 1945-74, the installation of the jetties, and navigational structures that exclude flow from shallow areas. The lack of one since then demonstrates the Corps' failure to have evaluated the past alterations of the estuary. A complete bathymetric survey run is also needed to evaluate the project's likely impacts to both the physical environmental (e.g., to predict distribution of salinity intrusion, temperature) and to living resources such as crab, which are driven upstream by salinity, thereby increasing the possibility of their entrainment. The Corps' plans to conduct bathymetric surveys are inadequate both in timing and frequency.

c. The project includes a mitigation package based on the analysis of impacts. Among other things, this mitigation substantially increases the amount of wetlands and riparian habitat in the project area. The detailed analysis of impacts to salmon, crab, smelt, and sturgeon support the conclusion that there should not be an impact to commercial and recreational fishing and shellfishing interests.

d. The Corps has long recognized that disposal in the vicinity of the mouth of the Columbia River (MCR) is a factor in littoral sand transport. The Corps has been working with local, state and federal agencies and the public for the past five years to identify nearshore ocean disposal sites that would benefit littoral sand processes and minimize impacts to fisheries resources. The Corps has also taken seriously the concerns raised about the potential impacts of the proposed channel deepening on sand transport to the coast. Exhibit J of the FSEIS specifically addresses those concerns and describes why the proposed deepening would not significantly alter the exchange of sand between the estuary and the MCR/coast. In addition, it is clear that many of the comments below regarding sedimentation and erosion are taken directly from the comments of the States of Washington and Oregon on the draft SEIS. The Final SEIS responded to the states' letters in detail. Each State also added conditions to their 401 certifications on the subject. NWEA did not appeal these state decisions.

e. The Corps disagrees with the Comment's claim that there are insufficient bathymetric surveys of the project area. The Corps annually conducts cross-line surveys over the entire length of the project area. Those cross-line surveys cover the main river channel from the edge of shallow water on one side to the edge of shallow water on the other side, at approximately 500-ft spacing. Most of the other shallow-water areas of the estuary were surveyed around 1980. The surveys are more than adequate for assessing potential project impacts. The Corps agreed in the 2001 BA and the FSEIS to continue the annual cross-lines surveys and to conduct a bank-to-bank survey of the estuary. The Corps has already completed this bank-to-bank survey. The State of Washington has also required an additional bank-to-bank survey within two years of completion of construction. The comment does not explain why this is insufficient. The estuary survey will be part of the ecosystem research being conducted to support salmon recovery.

As documented in the 1999 IFR/EIS, 2001 BA, and 2003 FSEIS, bathymetric surveys are only one of the resources used to evaluate potential habitat and morphological changes that might result from the proposed project. The SEI expert panel found the Corps had an adequate understanding of the physical processes of the river and estuary to reliably evaluate the potential impacts to sedimentation, salinity intrusion, and fish habitats.

Also see response to State comment S-52 (FSEIS at Volume 4, p. State-25).

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- f.** The Corps claims that dredging and channel modifications upstream of RM 40 have not “measurably altered the available sand supply or sand transport to the river.” Yet no bathymetric difference studies have been performed for this area on which the Corps could rely. Little analysis of bathymetric change has been done outside the channel above RM 48. Therefore there has been no evaluation of dredging and channel modification effects, including identification of changes in the volume of sediment, upstream of RM 48. The Corps identifies a 1961 study by Hickson as estimating 40 mcy of erosion between Bonneville and the estuary, between 1920 and 1960. There is no evidence as to whether this erosion has continued and, if so, where this erosion has taken place. It is not clear whether Hickson evaluated just the channel areas or whether the shallows and dredged material disposal areas were included. Were all the areas examined for evidence of accretion simultaneously? What do historic experiences of erosion and/or accretion in the estuary say about what will happen in the estuary over the 50-year life of the project and beyond? Are shallow areas likely to erode or are they likely to accrete? The Corps has no data upon which to make such critical projections.
- g.** Many forms of monitoring are needed. For instance, it is evident from the FSEIS that little is known about sediment transport processes, sediment supply, and other issues. In fact, NMFS initially concluded that there was insufficient information to define impacts and it is clear from the agency’s 2002 Biological Opinion that it has no technical expertise in these areas. The proposed monitoring stations and the data they are to collect are both insufficient to remedy these gaps in the future and too late to rectify the inadequacies of the FSEIS. The Corps should already have been regularly assessing changes in sand transport, sediment properties, suspended sediment, ETM properties, salinity, temperature, stratification, etc. Without such baseline information not only does the FSEIS fall short of meeting NEPA requirements but the alleged adaptive management scheme will fail for lack of the critically-important baseline information. Changes cannot be measured unless they are measured against something.
- h.** There has been very little sediment core sampling done, particularly in slide slopes that are expected to “adjust.” It is not clear how much of the side slope that will erode is clay. Not only does the Corps not know what will erode from predicted adjustments to channel deepening, it does not know how the existing physical environment has already and is currently changing. Ship waves, especially at sites near the navigation channel, can create shore notches which can dramatically impact slope evaluations.
- i.** Monitoring to support the proposed so-called adaptive management scheme is unclear. We reiterate our previous comments in this regard and add that the new proposed staged implementation of the Miller-Pillar site suffers from the same flawed analysis. Without having established baseline information, clear and measurable objectives, and monitoring standards, the Corps cannot evaluate whether the previous stages of that project are successful or not. Certainly the public cannot determine from the FSEIS what are supposed to constitute “successful results”

f. Over the past 70 years, the Corps has built up a great deal of knowledge and a sound understanding of the sedimentation processes of the Columbia River. The effects of dredging and channel modifications upstream of RM 40 have been assessed numerous times, including the following reports referenced in Exhibit J of the FSEIS; Hickson 1930 and 1961, Locket 1963, USACE 1986, 1987, 1999, and 2001, and Eriksen and Gray 1991. The SEI expert panel affirmed the Corps’ knowledge and understanding of Columbia River sedimentation in 2001. As explained in Exhibit J of the FSEIS, a bathymetric volume change analysis is not necessary to determine sediment availability.

The details and methodology of Hickson’s volume change analysis were not reported in the 1961 paper.

The erosion/accretion history of the estuary is described in Exhibit J of the FSEIS. Expected areas of future erosion and accretion are described in the FSEIS.

Also see response to State comments S-38 and S-45 (FSEIS at Volume 4, p. State-20 and 23).

g. As explained in the responses above, the Corps has developed a good understanding of the Columbia River’s sediment processes and presented that information in the 1999 IFR/EIS and 2003 FSEIS. The SEI expert panel affirmed this during the ESA re-consultation with NOAA Fisheries.

The level of sediment monitoring necessary in the Columbia River depends on the issues to be addressed. The sediment monitoring actions described in the FSEIS were developed in cooperation with NOAA Fisheries and USFWS to confirm the expected impacts from the proposed project. The monitoring focuses on the identified impacts and provides a base for adaptive management.

Also see response to State comment S-52 (FSEIS at Volume 4, p. State-25).

h. The available evidence (historic survey data, dredging records, bed samples, disposal deposits, and channel geomorphology) indicates that the areas of expected side-slope adjustment are composed of sand. In such areas core samples should not be necessary. The expected side-slope adjustments occur because of the transport mechanisms that drive sand wave movement on the riverbed (Eriksen and Gray, 1991). Clay deposits would resist erosion and reduce the expected adjustment, just as the natural shoreline resists erosion much better than the sandy disposal sites. Past changes to the river channel are described in Exhibit J of the FSEIS. The effects of ship wakes on shoreline erosion are discussed in the 1999 IFR/EIS. Riverbed side-slope adjustments and some shoreline erosion are predicted to alter the accretion and erosion patterns within shallow water and flats habitat in the Lower Columbia River at five locations – RM 99, 86, 75, 72, and 46 through 42. A single location in the estuary, RM 22.5, is projected to experience riverbed sideslope adjustments. These six locations are all historic shoreline disposal sites, and provide limited salmonid habitat.

i. With regard to adaptive management for erosion, the pre and post-contraction bank-to-bank surveys will provide a baseline and initial post-construction reference point. The annual surveys of the channel and the annual reporting of actual volumes of sand dredged will provide information needed to determine whether erosion and accretion are occurring consistent with the Corps’ projections.

With regard to restoration actions, the Corps developed a management objective (25% ground cover after O&M year 5) for tidal marsh establishment in the implementation plan for the Miller-Pillar and Lois Island ecosystem restoration features (See <https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>). The Implementation Plan, and its associated objectives and monitoring standards, were submitted to NOAA Fisheries and the U.S. Fish and Wildlife Service for their review and approval. The Implementation Plan for the Miller-Pillar and Lois Island embayment ecosystem restoration features have been approved by these agencies. The State of Oregon has disallowed the Miller-Pillar ERF. However, the Corps provides this response regarding the Miller-Pillar location because of its relevance to Lois Island.

The Implementation Plans for these two restoration features are virtually identical with the exception of the location of reference or control locations. For ease of reference, we are providing the monitoring effort for the Lois Island embayment restoration feature in the text following this paragraph. See Implementation Plan, Term and Condition 5f. Species composition and primary productivity of tidal marsh will be measured for the restoration and reference sites. A similar investigation will address benthic invertebrates and juvenile salmonid/fisheries use of the restoration and reference sites. These include pre-construction monitoring efforts to provide additional baseline information.

Pre-Construction Monitoring Effort

a. Tidal marsh elevation survey

1. Lois Island embayment marshes at Lois Island, Mott Island and South Tongue Point – 3 transects from lower tidal marsh vegetation line to tidal marsh-upland transition elevation. One survey per location will be conducted to establish target elevation for ecosystem restoration feature.

2. Control Site (East Lois Island tidal marsh) - 2 survey transects from lower tidal marsh vegetation line to tidal marsh-upland transition elevation.

b. Juvenile Salmonid/Fisheries Use: Juvenile salmonid use will be measured in the Lois Island east marsh, fringing marshes of Lois Island, Mott Island, and South Tongue Point and within the ecosystem restoration feature. Due to their intertidal location and vegetative cover, trap nets would be used. A purse seine would be used to sample fisheries use in Lois Island embayment.

c. Benthic Invertebrate Productivity: Sampling locations, methodology and level of effort will be comparable to that described for post-construction monitoring.

d. Tidal Marsh Primary Productivity: Sampling locations, methodology and level of effort will be comparable to that described for post-construction monitoring.

Post-Construction Monitoring Effort

a. Tidal Marsh Plant Production: Tidal marsh plant production would be assessed in a manner generally comparable to the methodology used for the Columbia River Estuary Data Development Program (1984). Sampling would occur in late July and early August. Plant cover and species composition will be determined from 5 sample locations each at Lois Island east marsh and within the ecosystem restoration feature with another 5 sample locations distributed around the perimeter tidal marshes that abut Lois Island (n=3), Mott Island (n=1) and South Tongue Point (n=1). These sampling locations will be permanently staked plus their Global Positioning System location will be recorded to ensure that sample sites are reoccupied in subsequent years. Plant cover data will be recorded from five replicate 0.5m² quadrats randomly placed around each sampling location. Percent live biomass would be determined from nine randomly placed 0.1 m² clip-quadrats at each sampling location. The simple harvest method utilizing peak total standing crop measurements, including both live shoots and attached standing dead material of the same season's growth will be used to estimate primary production.

b. Benthic Invertebrate Productivity: Benthic invertebrate productivity will be measured per the methodology used by NOAA Fisheries in the Columbia River estuary (see Hinton et al. 1995. In-Water Restoration Between Miller Sands and Pillar Rock Island, Columbia River Environmental Surveys, 1992-93). The sampling timeframe would be May, July and September. Ten sampling stations would be established in the Lois Island east marsh and within the ecosystem restoration feature. Five of these 10 sampling stations would be paired with the tidal marsh plant production locations. Benthic invertebrate sampling locations would also be established in the Lois Island (n=5), Mott Island (n=3) and South Tongue Point (n=2) fringe marshes. Five of these sampling stations and would be paired with tidal marsh plant sampling locations. These sampling locations will be permanently staked plus their Global Positioning System location will be recorded to ensure that sample sites are reoccupied in subsequent years.

c. Juvenile Salmonid/Fisheries Use: Juvenile salmonid use will be measured in the Lois Island east marsh, fringing marshes of Lois Island, Mott Island, and South Tongue Point and within the ecosystem restoration feature. Due to their intertidal location and vegetative cover, trap nets would be used. A purse seine would be used to sample fisheries use in that portion of Lois Island embayment not used for development of the ecosystem restoration feature. The sampling timeframe would be May, July, and September.

Monitoring Schedule: Monitoring efforts would occur in construction years 1 and 2 and years 2, 6 and 10 during Operations and Maintenance. Photographs will be obtained at each sampling location to document control and ecosystem restoration feature conditions.

Correspondence: NOAA Fisheries and the U.S. Fish and Wildlife Service will be notified of contractors employed to accomplish these actions, dates of their notices to proceed, and when final reports are due. Each agency will be furnished final reports on each monitoring action as they are received.

Adaptive Management Actions: If tidal marsh sampling results indicate that vegetation establishment has not attained a level of 25% ground cover by O&M year 2, then actions to harvest seeds and propagules for planting in the ecosystem restoration feature will be evaluated and implemented if necessary.

Progress Report: Monitoring reports for each pre- and post-construction monitoring action will be provided by December 1 of each monitoring year. These reports will discuss results to date, provide recommendations on potential methods to improve the specific restoration feature.

Implementation Plan, Term and Condition 5f.

The timeframe for successful reestablishment of tidal marsh vegetation and benthic invertebrates, 5 to 10 years or more, depending on the species and their means of colonization, was identified in 2001 Biological Assessment for the Columbia River Channel Improvements Project (See page 8-13). Impacts were discussed in the FSEIS on pages 6-29, 6-30, and 6-32 to 6-34.

The proposed restoration actions are voluntary actions under Section 7(a)(1) of the Endangered Species Act and do not represent mitigation for any project related impact. The restoration features were developed in concert with the U.S. Fish and Wildlife Service and NOAA Fisheries. Further, modifications to some of the proposed restoration features were incorporated before the FSEIS was issued based upon comments received on the Draft SEIS. Specifically, the Lois Island embayment restoration was modified to reflect the public and stakeholder desire for tidal marsh habitat rather than shallow subtidal – tidal flat habitats, which they noted was an abundant habitat in the estuary.

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and whether the Corps will be able to determine success from failure as it implements this uncertain scheme.

B. The Corps Has Failed to Evaluate Sediment Transport Issues, Has Ignored or Arbitrarily Rejected Evidence, and Has Inadequate Data Upon Which to Base an Evaluation of Significant Issues

1. The Corps Lacks Data Resulting in Significant Uncertainties

- j. Inadequate data exist on the sand transport between the MCR and the littoral cell. Sand extraction from the MCR and channel constitutes a net loss of sand from the coast. The degree to which the project will cause further alteration of the balance between the river/MCR and the coast requires data, analysis, and modeling. The Corps states that there is no sand inflow into the area below Bonneville Dam however there is some supply from the Willamette and Cowlitz, etc. that needs to be quantified.

Essential influences on sediment transport have not been evaluated in the FSEIS. The Corps does not include any realistic evaluation of changes in bed stress or stratification that strongly influence sediment transport and would be affected by channel deepening, particularly in the estuary where sediment transport is more complicated than in the river channel. Uncertainties in the sediment budget along with information from SW Washington Coastal Erosion Study indicate the need for better assessment and quantification of sediment transport. There has been no measurement of sediment transport for the Columbia River and the Corps does not propose to begin such monitoring. As a result, the Corps “conclusive findings” in Exhibit J are actually unsupported. The Corps has not collected nor does it intend to collect sufficient data on sediment transport, contrary to NEPA requirements. The Corps does not propose any actions to reduce the uncertainty. Given the number of uncertainties regarding the sediment budget, the Corps needs to formulate a comprehensive program of monitoring, process studies, and numerical modeling of circulation and sediment transport at the level of peer-reviewed science.

2. The Corps Ignores Effects of Sand Deficit

- k. Changes in river flow management have affected sand supply in the estuary. The last complete bathymetric survey, in 1958, showed accretion in the estuary, likely the result of high river flows in 1945-74. Since then, there have been dramatic changes in the sand supply of the estuary, caused by significant changes in river flow management. The rate of sand removal being greater than river sand supply to the estuary means that the sand removed from the estuary is coming from some place. Dredging has exceeded fluvial sand inflow in all but six years since 1910 (four of these six years were prior to the channel being 35 feet deep), making the status quo unacceptable. There is, therefore, likely to have been a corresponding significant change in the

- j. The Corps believes that there is adequate sedimentation data available to assess potential project impacts. The Columbia River Channel Improvement Project has presented a comprehensive series of sedimentation analyses that include the 1999 FEIS, the June 2001 SEI workshop on sedimentation, the 2001 BA for endangered fish, and finally Exhibit J of the 2003 FSEIS. These analyses are based on the abundant available data on the Columbia River (Exhibit J references 37 reports and papers on sedimentation and that is not a comprehensive list of available reports) and years of individual experience with the Columbia River hydraulics and sedimentation. The SEI expert panel affirmed the reliability of the Corps’ sedimentation analyses when they found the Corps adequately understood the physical processes of the river and estuary, including flow alterations, dredging volumes, suspended sediment and bathymetry changes.

However, it should be noted that the Columbia River system imposes inherent limitations on a perfect understanding of sediment transport. The reasons for this are; suspended sediment concentrations are low, average annual sediment transport is small, bedload moves predominately during flows over 300,000 cfs and is difficult to measure, there is a wide range in river discharges and large freshets are infrequent, the estuary is large and contains a variety of bathymetric and hydraulic environments (such as Cathlamet Bay, the North and South channels, the inter-tidal flats, and near the entrance), and the hydraulic conditions at the MCR are complex and hazardous to work in when sand transport is likely the highest (high tidal or river discharges and/or high wave conditions). To measure sediment transport throughout the Columbia River, estuary, and MCR system would require a very large annual monitoring effort, for an extended period of years to cover the wide range of special and temporal variations in the system. The development of a precise sediment budget for the entire system is not necessary because you do not need to know the entire budget to assess changes when the mechanisms of transport are not changing. Sand inflows downstream of Bonneville Dam and available sediment transport measurements are described in the FSEIS.

Also see response to State comment S-52 (FSEIS at Volume 4, p. State-25).

- k. The FSEIS describes the historic changes in sand supply to the estuary and the estuary’s response to those changes. The FEIS, BA, and FSEIS describe shoaling processes and the estuary’s response to past dredging. Those reports acknowledge that localized areas in the estuary adjacent to frequent, high-volume dredging sites have eroded and are expected to erode further in the future. See, e.g., FSEIS at Appendix A to Exhibit J, pp. 54-57, 60-62. This erosion could extend outside the navigation channel, but is not expected to impact the shallow water salmon habitats in Cathlamet and Grays bays.

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response of the estuary to this change in sand supply. Yet the Corps assumes that nothing has changed. All parties agree that the sand budget is out of balance, that more sand is being removed than is being supplied. Some of this deficit in the estuary will be made up from sediments coming in from the ocean, but eventually, estuarine and fluvial topography must degrade. Without any data, the Corps does not know whether this process has begun, or not.

- l. Existing levels of coastal erosion immediately adjacent to the MCR, inlet and offshore from the Clatsop Plains demonstrates significant changes in sediment transport have taken place and will continue and demonstrates that the littoral system is starved of sediment. This must be from a major change in the sediment budget of the river/coast system. Measurable erosion of coastal beaches is evidence that the estuary is serving as a sink for coastal sediment. The CREDDP studies also found a landward pattern of sediment flow. The Corps' McLaren report states that the flow is not outward, meaning that it found a change in historical patterns. The Corps admits that coastal erosion is occurring but does not attribute this to the estuary functioning as a sink for sediment. Models show that apparent increases in wave heights documented only result in minor adjustments to the system. Therefore, erosion is much more likely to be related to a general decrease in the supply of sediments from the Columbia River to the coast. The Corps has no alternative explanation for why the estuary is full of coastal sand.

Jetty construction initially postponed the effects of beach erosion caused by other human actions. Beach erosion is now highly evident. While changes in the sediment budget have been manifested on coastal shorelines, they will also eventually be manifested elsewhere, namely in the estuary, as it begins to reverse historic accretion. Without regular bathymetric surveys of the entire system, not just the channels, the Corps cannot determine areas and patterns of erosion and accretion.

The FSEIS fails to evaluate the ways in which the project will affect the sand budget. Sand discharge of the river to the coast has been reduced due to flow regulation, irrigation, and climate change. This has the effect of increasing the negative influence of dredging on the sand budget over the last 30 years. The net extraction of sediments in the estuary caused by flow regulation and upstream dredging is increasing space in the estuary to accommodate even greater amounts of coastal sand. Likewise, shelf building processes will be affected by dredging/disposal. Shelf building processes depend upon sand export to the shelf. This is no longer taking place as the sand is eroding from the coast into the estuary channel. The shelf is important as a source of sediment to coastal beaches.

- m. Sandy beaches will not be the only areas to erode; the estuary is likely to erode too. Since the Corps takes the position that 1) dredging is not related to sand supply but rather to re-distribution of sediments, and 2) that channel deepening removal will eventually lead to less maintenance dredging, one has to conclude dredging will eventually lead to erosion of shallow water areas within the estuary. There is a deficit in the estuarine sand budget and this will cause degradation

l. The Corps has agreed to conduct a bank-to-bank bathymetric survey of the estuary prior to construction and to perform annual bathymetric surveys in and adjacent to the navigation channel. The Corps will also perform a post-construction bank-to-bank bathymetric survey from River Mile 3 to 18 within 2 years after construction as required by the State of Washington. These surveys will provide an update of overall estuary sedimentation and monitor the predicted channel response to the 3 ft deepening.

The comment's characterization of the Columbia's littoral system as sediment starved, conflicts with the recent findings of Gelfenbaum et al (2001) that since 1926 there has been a net accumulation of sediment. The Clatsop Plain inner shelf and offshore areas certainly show consistent decreases in volume that suggest sediment-starved conditions. However, erosion in the MCR and South Flank areas may very well still be in response to the hydraulic disturbance caused by the MCR jetty construction. Kaminsky (2000) notes that it is difficult to determine if those areas are yet approaching equilibrium with the jetty perturbation of the early 1900's.

The FSEIS describes reductions in the Columbia River's sand yields to the coast that have occurred over time scales of 10's to 1,000's of years. Those reductions may contribute to the observed sediment volume decreases on the Clatsop Plain offshore area, but other possible causes should not be overlooked. The Columbia River littoral cell sediment erosion and accretion appears to be driven by far more complex physical processes than the reviewer's comment suggests. Other potential causes of current sediment trends include increased wave heights (mentioned, but dismissed by the reviewer), the still active sediment system response to the MCR jetties, sea level change, and large-scale climate variations such as El Nino/La Nina events.

The Corps has evaluated the Project's potential impact to the sediment budget and does not believe that the extraction of sand from the navigation channel, upriver or in the estuary, will impact the coastal system in the predictable future (FSEIS). Approximately 63 mcy is forecast to be removed from the river (RM 40-106) and disposed of upland during the first 20 years of the proposed project. As explained in the FEIS, BA, and Exhibit J of the FSEIS, the removal of this material will not reduce the available sand supply or the river's sand transport capacity, and thus will not alter the river's sand yield to the estuary. In the estuary (downstream of RM 40) the disposal plan is similar to past practices. Only 7 mcy dredged between RM 20-30 are planned for upland disposal, going to Rice and Pillar Rock islands. The remainder of the dredged sand, about 38 mcy, would be placed back in-water, minimizing the extraction of sand from the estuary. Comparing the 7 mcy of estuary upland disposal to the Sherwood et al. (1984) estimates of the volume of accommodation space, approximately 2,000 mcy in the estuary, shows the insignificance of this upland disposal volume. Thus the proposed upland disposal (extraction) is not likely to alter the estimated 800 years that it may take to fill the estuary. It should be noted that there is an additional 3,000 mcy of accommodation space in the entrance and that 7,700 years are estimated to be required to fill the combined estuary and entrance volumes.

The FSEIS provides a description of the complex sediment movements at the MCR. At the MCR, sand is discharged from the estuary to the coast, sand also enters the estuary from the MCR, and some of the sand entering the estuary from MCR does accumulate in the estuary. The FSEIS describes the pathways for sand entering the estuary from the MCR as being through the North Channel, with sand accumulation occurring in the North Channel and on Desdemona Sands, however, the estuary is certainly not "full" of coastal sand as the commenter claims. As explained in the FSEIS, the available studies of this very complex area provide similar, but slightly differing results as to the movement of sand through the MCR. The Corps believes the differences are related to differences in the flow conditions at the times of each study.

For these reasons the Corps does not foresee the 43-ft channel causing any significant changes in the movement of sand into or out of the estuary, through MCR, or in the rates of sand accumulation in the estuary.

Also see responses to State comments 37, 39, 40, and 48 (FSEIS at Volume 4, p. State-20 through 21, 24).

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over time. In fact, the Corps uses this degradation to justify its low dredging estimates.

- | **n.** The Corps argues that there is a lot of sand available in the system. It does not take into account that sediment that is available for transport is finite, especially considering the dams and flow regulation. The bulk of sediments in the system are held in storage. In addition, sediments available for transport are those very sediments that are being dredged. The proposed major dump sites will make situation worse. The Lois Mott and Miller-Pillar so-called “restoration” projects, in conjunction with the Deep Water Site, will not lead to overall improvement because they all will remove sediment from the active transport system. Therefore, the use of these sites reduces the fluvial supply of sand to the lower estuary. Second, these projects will take littoral sand out of the system, making room for more littoral sand to move into the estuary. Neither of these significant issues is addressed by the Corps.
- | **o.** In its Exhibit J, the Corps concludes past dredging and channel modifications “have not yet measurably altered sand supply or sand transport in the river or estuary.” Yet tables in that report demonstrate dredging has played a major role in the sediment budget for most of a century. In addition, net removal of sand from the system is a practice initiated only within the last 20 years and the influence of dredging has increased over the last 30 years due to reduced sand discharge caused by other influences. Over a 50-year period sand disposed in upland sites would be approximately 1.5 Mm³/yr. During 1935-58 river sand supply is estimated to have been 2.6Mm³/yr, suggesting that at that time upland disposal was less than supply. The FSEIS also concludes that dredging will not reduce sand supply. The Corps states that the project “will not reduce the abundant sand supply available in the riverbed within the project area.” Yet it claims total sand transport is 0.4-1.0 mcy/yr and proposes to remove 70 mcy within the next 20 years, a rate of 3.5 mcy/yr. Therefore it would remove 3.5-8.75 times the amount of sand transported annually. This is a net extraction of sand.
- | **p.** Finally, the Corps concludes that dredging will not affect MCR/littoral cell. The Corps claims deepening “will not alter the sand transport through the MCR nor the sediment budget of the littoral cell.” Yet, Allan and Beaulieu (2002) conclude that “any extraction of sand adjacent to the river mouth and navigation channel does constitute a net loss of sand....[which] continues to deplete sand from an already starved coastal system.” While the Corps claims that global climate variations that reduced stream flows were the primary cause of sand transport decline between 1800s and 1972, Allan and Beaulieu state: “This statement completely ignores the role of major dam construction and the impact impoundment has had on sediment supply in the Columbia River....Furthermore, the above statement ignores the role of dredging, which has removed substantial quantities of sediment from the system. Indeed, there appears to be no comprehensive assessment of the effects of dredging on sediment supply.”
- | **q.** The Corps argues that since the present river system does not discharge sand to the coast, channel

m. The Corps disagrees with the comment’s conclusion. The FSEIS describes the historic changes in sand supply to the estuary and the estuary’s response to those changes. The FEIS, BA, and FSEIS describe shoaling processes and the estuary’s response to past dredging. Those reports acknowledge that localized areas in the estuary adjacent to frequent, high-volume dredging sites have eroded and are expected to erode further in the future. See, e.g., FSEIS at Appendix A to Exhibit j, pp. 54-57, 60-62. This erosion could extend outside the navigation channel, but is not expected to impact the shallow water salmon habitats in Cathlamet and Grays bays. The comment’s conclusion that “dredging will eventually lead to erosion of shallow water areas” is not supported by the analysis.

n. As explained in the 1999 FEIS, the 2001 BA and Appendix A to Exhibit J of the FSEIS, there are ample sand sources downstream of Bonneville dam to maintain the sand supply for the Columbia’s sand transport for many hundreds of years. The FEIS notes that there is as much as 100 mcy of sand just in the river’s active sand wave zone downstream of RM 106. The sand wave zone is only the top 4-8 feet of the riverbed’s alluvial sand deposits that range from 100 feet deep near Portland/Vancouver to 400 feet deep in the estuary. Where dredging removes sand, it will expose the underlying sand to the river’s hydraulic forces and that sand will then become part of the active sand transport system.

As noted in response to comments above, the volume of sand to be removed from the estuary’s active sediment system is very small compared to the already existing accommodation space for riverine or coastal sand. The great majority of the sand that would be disposed of in the Lois Mott, Miller-Pillar or ocean sites comes from upriver of River Mile 15, and are therefore riverine sources and not from the littoral system.

Also see responses to State comments 39, 53, and 77 (FSEIS at Volume 4, p. State-21, 26, 41).

o. The Corps chose not to include the sand volume changes in the riverbed in our sediment budget because neither the riverbed volumes nor the upland disposal volumes are available for transport. This does not limit the Corps’ analysis because that sand was simply moved from storage in the riverbed to storage on shore. The resulting changes in the depths and shape of the river channel were outlined in Exhibit J of the FSEIS. It is the Corps’ expectation that placing future dredged material upland will lower the riverbed enough that bedload transport can proceed without interfering with the navigation depths and thus reduce future maintenance dredging. Not all the sand in the Columbia River system is available to supply the sand transport system, much of it is held in long-term storage in the riverbed. As explained in the following paragraphs, the available sand supply in the riverbed is actually only a surface layer directly exposed to the river’s currents.

Suspended sand is picked up by the river and carried along in the water column at near the average speed of the river. The Columbia has attained its suspended sand transport capacity before it reaches the project area. The primary sources for the suspended sand are the Columbia’s riverbed between Vancouver and Bonneville dam, and tributary streams, especially the Sandy River. The suspended transport occurs under most flow conditions with the rate dependent on the river discharge. As the suspended sand is carried through the river there is an active exchange process between the water column and the riverbed, some sand settles to the riverbed and other sand is eroded from the bed surface and enters the water column. This exchange process is referred to a dynamic equilibrium. Where the river enters the estuary, RM 40, the suspended sand transport is the same as at the upstream end of the project. The sources for suspended sand exiting the river to the estuary are the riverbed upstream of Vancouver, the riverbed through the river reach, tributaries upstream of Vancouver, and tributaries in the river reach. Because the river maintains a dynamic equilibrium, suspended sand does not contribute measurably to navigation channel shoaling, and dredging and disposal do not alter suspended sand transport.

Bedload is a layer of sand a few grains thick that is rolling and bouncing along on the surface of the riverbed. Bedload moves much slower than the suspended sand because the bottom velocity is less than the river's average velocity and because of the friction between sand grains and the bed surface. Bedload transport rates also depend on flow conditions and the rate increases rapidly when river discharges exceed 300,000 cfs. Bedload sand grains move intermittently and usually only for short distances, traveling on the order of hundreds of feet per year in the Columbia River. The source for bedload is therefore the surface of the riverbed in the immediate vicinity of the transport. Bedload influences and in turn is influenced by the shape of the riverbed. Bedload forms the sand waves found on the surface of the Columbia's riverbed that are the primary focus of navigation dredging. The side-slopes of the riverbed help determine the local direction of bedload transport.

Overall, the Columbia River's bedload transport appears to be at, or at least near, dynamic equilibrium in the project area; the amount entering the river reach at RM 106 is not discernibly different from the amount leaving at RM 40. However, because bedload is a localized process, site-specific currents and bed topography, can simultaneously produce areas of erosion, accretion, and dynamic equilibrium across the riverbed at any given location. Bedload accretion caused by local riverbed topography is the primary cause of shoaling in the navigation channel. Most of the sand dredged from navigation shoals is in at least temporary storage; only the surface layer would be part of the bedload transport. Dredging does not alter the bedload transport because after dredging a new surface layer is exposed and it then becomes part of the bedload transport.

Also see response to State comment S-87 (FSEIS at Volume 4, p. State-43 through 44).

p. The Corps does not agree that the extraction of sand from the navigation channel, upriver or in the estuary, will impact the coastal system in the predictable future. Approximately 63 mcy is forecast to be removed from the river (RM 40-106) and disposed of upland during the first 20 years of the proposed project. As explained in the FEIS, BA, and Exhibit J of the FSEIS, the removal of this material will not reduce the available sand supply or the river's sand transport capacity, and thus will not alter the river's sand yield to the estuary. In the estuary (downstream of RM 40) the disposal plan is similar to past practices. Only 10 mcy are planned for upland disposal in the estuary. Approximately 6 mcy would be placed as in-water fill at each of the two ecosystem restoration sites (Lois Island and Miller-Pillar) or in the ocean. The remainder of the dredged sand, about 30 mcy, would be placed back in-water by means of flowlane and shoreline disposal, minimizing the extraction of sand from the estuary. During channel maintenance, sand dredged from CRM 3-13 will be placed in flowlane sites near CRM 5, keeping the sand in the active transport zone and moving that sand closer to the MCR.

The second quote from Alan and Beaulieu in this comment refers to a paragraph that is part of a summary of the sedimentation analysis presented in Appendix A of Exhibit J to the FSEIS. The impact of Columbia River dams on flow regulation and thus on sand transport are acknowledged two sentences later in the same paragraph of Appendix A. The effects of climate changes, dams, and dredging and disposal are examined in detail in Appendix A. Figure 2 of Appendix A clearly shows the decline in sand transport that occurred before the construction of the Columbia River dams. The question of how much sand is being impounded by the dams is irrelevant to assessing the potential sedimentation impacts of the proposed 43-ft channel because, as discussed elsewhere, there is ample available sand supply in the river system below Bonneville Dam and the Project is not projected to change sand transport mechanisms. As explained in the 1999 FEIS, the 2001 BA and Appendix A, there are ample sand sources downstream of Bonneville dam to maintain the sand supply for the Columbia's sand transport for many hundreds of years.

See responses to State comments S-40 and S-39 (FSEIS at Volume 4, p. State-22 and 21).

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deepening is not a problem because it does not alter the status quo. This ignores the fact that the status quo is not acceptable. In addition, the project is a substantial change in the status quo; it is not merely a 3 foot deepening but a substantial change in sediment management practices that will remove more sand from the system than before.

3. The Corps's Analysis of Data is Defective

- r. By averaging flow/sediment data, the Corps ignores the effect of the Pacific Decadal Oscillation (PDO) on its estimates of dredging volumes. The wet period of the PDO generally lasts longer than the dry period. We are entering a wet period, yet the Corps has based its projections of sediment volumes on the averages from a particularly dry period (1980-95). After correcting for flows (the ratio of high to low flows is 1.65), the more likely volumes would be 170 percent of what the Corps is projecting. In addition, the Corps has historically underestimated dredging volumes: for example, the last 20 years of sediment volumes have been 140 percent of the predicted volume. While eventually dredging volumes will be reduced, in the interim, the system will likely respond by eroding where it has historically accreted, with the result that dredging volumes will be maintained and habitat will be eroded, both issues the FSEIS fails to address. The Corps averages data that should be evaluated by climate conditions. The Corps needs to make its sediment volume estimates based on multiple climate scenarios. Instead, it has averaged out the record of river flows, regardless of cause, and sand supply thereby creating the impression that there is no link between them and dredging. In fact, when periods of high flow are evaluated separately from periods of low flow, the data demonstrate that the Corps has seriously underestimated the volumes. This includes, but is not limited to, the role of the PDO.
- s. The Corps omits sand removal histories. Past removal of sand to land has been underestimated. In addition to the MCR and main navigation channel projects, there were a number of navigation projects in the estuary that required dredging: Skipanon River channel (responsible for the large spits at the mouth of the Skipanon), Baker Bay channel (from E. of Upper Sand Island to the vicinity of the Coast Guard base, used for rock barges), Ilwaco, and Chinook. In addition, Mott and Lois Islands were created, among many others, the Tongue Pt Seaplane base area filled, and downtown Astoria filled around 1921 after fire destroyed the original downtown (built on pilings). There are also major fills around Puget Island and Tenasillahe Island. Other fills are located near the Port of Astoria and west of Tongue Pt (inside the railroad tracks). Early in the 20th Century, Longview was also filled. We do not currently know to what extent these urban fills were channel maintenance projects, but they certainly used sand. Finally, the numerous dikes in the system contain sand that has been permanently removed from the system.

4. Fundamental Flaws Exist in the Corps' Analysis

- t. Sand movement processes include suspension in high flows. In the FSEIS, the Corps takes the

q. The Project, relative to the existing Dredged Material Management Program and current practices, reflects some change in disposal practices that will place more sand in upland disposal sites. This change in part is the result of the ESA listings and direction from the federal resource agencies. Upstream of CRM 40, approximately 63 mecy is forecast to be placed in upland disposal sites during the first 20 years. Most of the new upland sites are upstream of CRM 75 and are beneficial use sites. As explained in the response to comments above, the disposal plan in the estuary (downstream of CRM 40) is similar to past and current practices. The current estuary disposal plan has already been approved by Federal and State regulatory agencies.

See responses to State comments S-53 and S-76 (FSEIS at Volume 4, p. State-26 and 40).

r. Contrary to the comment, the Corps did not average flow or sedimentation data used for its analyses. Rather, the Corps' analysis is based on the historic time-series data. The temporal variations in the Columbia River's sediment budget and the contributing factors, both natural and anthropogenic, are clearly described in the text. See FSEIS at Appendix A to Exhibit J; see also FEIS at Section 4.4.3.2. The influence of climate variation, including the Pacific Decadal Oscillation (PDO) or El Nino/La Nina cycles, on the river's hydrology and sand transport is acknowledged and referenced in Exhibit J.. Therefore, the comment that the analysis does not include climate variation is inaccurate. In the future, sand transport volumes caused by high annual discharges will be moderated due to the peak discharge reductions resulting from flow regulation by the upstream reservoir system.

It also must be recognized that a good correlation only exists between river discharges and sand transport, and that there are not good correlations between river discharge and dredging volumes or between sand transport and dredging volumes. The dredging forecast used in the FSEIS was first presented in the IFR/EIS and is based on an analysis of physical factors such as bathymetric changes, sources of shoaling material, type of shoals, and dredging and disposal practices.

See response to State comment S-41, and Stakeholder comment S/S-266 (FSEIS at Volume 4, p. State-23 and S/S-162).

s. Other dredging and disposal actions have occurred in the Columbia River and estuary during historic times (see FSEIS at p. 6-89). For purposes of more detailed analysis, it was not our intent to provide a complete history of all dredging and disposal actions, but only those central to evaluating the potential sediment impacts of the proposed deepening of the federal navigation channel.

See response to State comment S-92 (FSEIS at Volume 4, p. State-45).

t. Exhibit J of the FSEIS clearly addresses both suspended and bedload sand transport. Exhibit J also describes what is known about sand accumulation in the estuary since 1958.

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position that all sediment is transported as bedload, disregarding the movement of sediment transported in suspension in high flows that is used by bedload transport to create bedforms. There was a long-term accumulation of sand in the estuary between 1868-1958 but there is no data on what has happened since.

- | u. One obvious flaw is the Corps' insistence that the MCR and the river channel can be analyzed separately. It is obvious to any lay person that the river does not operate as if there were a magical wall at rivermile 3. Moreover, the Corps seeks to meet NEPA requirements by citing to ESA consultation documents, such as the 1999 Operation and Maintenance Biological Opinion. This Bi Op purports to include the MCR along with the river channel although it contains no analysis whatsoever on the MCR.

5. The Corps is Inconsistent in its Analysis

- | v. The Corps states there will be no effect on available sand supply because there is unlimited sand supply. Yet the Corps states that "alteration of the channel bathymetry, resulting from dredging and flowlane disposal, has the potential to change the relative balance between the freshwater velocities and ocean tidal forces." The Corps also states that "tidal forces have established a pattern of sediment transport within the Columbia River Estuary, which is responsible for the fact that river sediments in transport close to the bottom are inhibited in their passage to the ocean. These forces also introduce ocean sediments into the estuary throughout the length of the salinity intrusion. As a consequence, bottom sediments from the ocean as well as from the upland areas are gradually filling in the estuary."
- | w. Likewise, the Corps is inconsistent on sediment discharge. The Corps claims there will continue to be a "small net discharge of sand from the estuary to the MCR." This contradicts its own statements that dams have eliminated sand supply to the coast. Moreover, McLaren and Hill (2001) concluded "the results of the STA clearly show that the nearshore shelves and beaches on both sides of the Columbia river mouth are sediment starved."
- | x. Either the Corps is underestimating supply or it is mining the system for sand, or both. The Corps assumes that there is no new sediment entering the system and that dredging is merely removing sediments that are rearranging themselves within the system (re-handling). In fact, it states that the amount of dredge volumes will go down after the channel is deepened. This means that the sediments to be removed by dredging will come from someplace within the estuary. In the near term, this amount is likely to keep dredging volumes high (i.e., the Corps has underestimated volumes) because the estuary has a lot of stored sand to give back and because dredging will encourage more littoral sand inflow. In the long term, since erosion cannot occur where the water in the estuary is bounded by dikes, the source of these sediments must eventually be the shallow water areas (which will erode salmon habitat).

u. The comment incorrectly characterizes the Corps' analytical approach. The BA, Channel Improvement BiOps and Exhibit J of the FSEIS treat the river/estuary/MCR/coast as an interrelated physical and biological system. Section 6.12 also specifically discusses the cumulative effects of MCR and Channel Improvement Project. In sum, while the FSEIS uses existing environmental documents as is encouraged by NEPA and SEPA, the FSEIS does not rely solely on existing documents such as the 1999 Operation and Maintenance BiOp, but provides new analysis, including cumulative effects analysis for the Project.

v. The Corps' reasoning for concluding that the proposed project will not significantly affect sand supply to the coast is clearly documented in Exhibit J of the FSEIS. In reference to the reviewer's two quotes from Corps documents; the first is simply an introductory statement recognizing the potential for change, which the BA analysis demonstrated would be negligible. The second quote is a very brief summary of just one of the sedimentation processes that are described in detail in Exhibit J.

See response to State comment S-77 (FSEIS at Volume 4, p. State-41).

w. The Corps has not been inconsistent about sediment discharge. The Corps' quoted statement is from the Draft SEIS and was changed in the Final SEIS in response to comments received on the draft, and now reads "sediment processes in the MCR are not likely to change and there will continue to be the transport of sand both landward and seaward at the MCR." FSEIS at Exhibit J, p. 11. Further, the Corps has not stated that dams have eliminated sand supply to the coast, only that flow regulation resulting from dams has reduced the sand supply to the coast. And finally, the quote from McLaren and Hill is not inconsistent with a Columbia River sand supply to the coast because, as discussed in earlier comments, there are a number of factors that are likely to be contributing to coastal erosion.

x. Contrary to the comment, the Corps has not assumed that no new sediment would enter the system, and has instead described the sediment sources to the Project area in the FSEIS. Further, as discussed above, the Corps has described how and where it expects bed elevations to be lowered following years of maintenance of a deeper channel (IFS/EIS, BA, and FSEIS). This river response has been accounted for in both the dredging forecast (IFS/EIS) and in determining that there should be no significant impact to shallow water habitats (BA and BiOp). While the Corps has included littoral sand as one of the sources of sand for the estuary, it is not a source of navigation shoal material. Finally, as demonstrated in the FSEIS and Appendix J, the Corps does not expect a deeper channel to significantly impact the rate of inflow of littoral sand to the estuary.

See response to State comment S-87 (FSEIS at Volume 4, p. State-43 through 44).

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The Corps states that maintenance dredging will be lowered due to removal of sand from the system that requires re-handling. It also says that there will be no change in the sand budget. The FSEIS does not explain this contradiction.

6. The Corps Ignores Costs of Coastal Erosion

- y. The Corps has failed to calculate the costs associated with coastal erosion caused by the maintaining the baseline projects. Washington Department of Fish and Wildlife estimates \$100 million dollars have been spent by the federal government in the last 10 years to control erosion and mitigate damages to the jetty system and public infrastructure of Grays Harbor and Pacific Counties, “all caused by starvation of sediment as identified in the coastal erosion study.” In addition, the project is likely affecting its own integrity: MCR jetties appear to be destabilized by sand removal from the estuary.

7. The Corps Failures to Evaluate Sand Budgets in Estuary Sub Areas

- z. Pile dike fields, which are intended to trap some sand and keep the rest moving, along with the jetties and the island fills (e.g., Rice Island) have diverted both flow and wave energy from shallow water areas (Grays, Baker, Cathlamet Bays) thereby increasing sediment accumulation. Grays, Baker, and Cathlamet Bays were historically much deeper than they are now. This shoaling has not been evaluated for its effect on salmon, other aquatic life, and the estuarine ecosystem.

C. The Corps Has Failed to Fully Evaluate the Historic and Projected Changes in Salinity

- aa. The Corps’ salinity report is preliminary and cannot be relied upon. The salinity report by Antonio Baptista concluded that his model did not provide evidence that would challenge the conclusion that the impact of deepening on salinity intrusion would be small. However, he also concluded that the results with regard to both salinity intrusion and impact on estuarine habitat opportunity could be used to “guide management decisions...only if model uncertainty is further reduced.” His report both admits and omits some limitations of the modeling exercise. It was not systematically calibrated, it does not discuss key aspects of the modeling process related to vertical and horizontal mixing, it does not confirm model results through data analysis, and it is premature to use an unverified model to make conclusions on habitat. In fact, the Corps’ salinity report ignores stratification and mixing. There are substantial consequences related to stratification which affect vertical mixing. While stratification and mixing are the hardest to get right in a model, they are therefore the strongest tests of model correctness.
- bb. The Corps’ salinity report also uses incorrect depths. It is based on analyzing the effects of an

y. As discussed in the FSEIS and Exhibit J, the MCR jetties and flow regulation resulting from Columbia River dams have affected sand transport at the mouth of the River. See FSEIS at p. 6-73. However, “excluding the historic effect of the MCR jetties, navigation channel development and maintenance, including maintenance of the MCR project, has not altered the estuary’s overall accretion/erosion or bedload transport patterns.” Id. Further, as discussed above, the Corps’ analysis also concludes that the Project will not cause increased coastal erosion. See Final SEIS at Section 6.2.2.4 (pp. 6-12 through 6-14). Because there is no projected increase in coastal erosion associated with the Project, it is inappropriate to assign a cost.

z. The physical effects of historic pile dikes are addressed in the FSEIS (p. 6-89), Exhibit J (p. 4, 6) and Appendix A to Exhibit J (throughout). The effects of historic pike dikes on salmonids were also addressed in the 2001 BA and 2002 BiOps (see, e.g. NOAA Fisheries BiOp at Section 5.2). However, because the State of Oregon has disallowed the Miller-Pillar ecosystem restoration feature, pile dikes are not part of the Project under consideration.

aa. The Corps’ hydrodynamic and salinity model is a three dimensional model that calculates parameters throughout the water column, allowing analysis of stratified situations, which are common characteristics of an estuary. The modelers, Dr. McAdory and Dr. Burger worked with both state and federal resource agencies to receive input and develop a consensus about the process before proceeding. None of the agency representatives, however, expected large changes to the estuary based on their past experiences with dredging activities in the Columbia River. Because its results matched data in the Columbia River Atlas, and other flow information, agency representative deemed the model adequate. The agencies agreed that a more detailed, rigorously verified model would not provide significant additional value. This modeling approach and the results were also reviewed by the SEI panel, and were found to be appropriate for analysis of the effects of the project. The Oregon Graduate Institute (Antonio Baptista) also developed and ran an independent model of salinity in the estuary to determine the project’s effects on salinity in the estuary. The results of this second, independent model were presented to the SEI panel, and confirmed the minimal impact predicted by the Corps’ model. This conclusion is consistent with opinions expressed by the SEI panelists. See SEI Meeting Minutes, May 14-15, 2001 (discussion following Antonio Baptista’s update on physical modeling); SEI Meeting Minutes, July 14-15, 2001 (Cody: “Plus the physical models were fairly convincing; the potential impacts of the project on those factors were pretty well understood.”).

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additional three feet of channel depth rather than the actual depth of the increased dredging. Salinity intrusion is very strongly dependent upon maximum channel depth. In addition, the salinity evaluation only addresses the effects of an additional three feet; if one considers the total cumulative effect of dredging on salinity of maintaining 40 or 43 feet, the changes in salinity intrusion are substantial. Likewise, considering the change from 20 to 55 feet in the MCR, along with the channel, changes the analysis. A cumulative analysis of channel effects on salinity intrusion is needed, because changes have been so large, yet the Corps has failed to do so.

D. The Corps Fails to Fully Evaluate Aquatic Life Effects

- cc.** There is little or no information on use of estuary by wild juvenile salmon upon which the FSEIS can be based. The Corps has not ensured that it obtained the necessary information for the FSEIS, resulting in an information base that concerns larger hatchery juveniles. The salinity intrusion length and mixing need to be evaluated for their biological effect on the ecosystem and aquatic life, including but not limited to salmonids. Likewise, the FSEIS' references to Green sturgeon are inadequate as they fail to take into account the status of the species, and build upon the continuing inadequacy of data and analysis related to the White sturgeon. Lack of data and analysis, described above, on the physical status of the estuary (e.g., changes in sedimentation, flow, and salinity patterns) precludes the Corps from evaluating the baseline conditions faced by salmonids and other species -- such as the negative effects of temperature -- as well as the effect of the project. The Corps' focus on channel conditions, and refusal to acknowledge that the project will have any impacts in the estuary whatsoever, results in its failure to evaluate the baseline and with-project conditions in salmonid habitat. The Corps relies on its flawed conclusions that the project will cause minor effects without fully analyzing whether various species can withstand such minor effects given their precarious status and the degraded state of their habitat.

E. Cumulative Effects

- dd.** The cumulative effects of human actions have had an effect on the physical and biological status of the river, estuary, and coastal areas affected by the Columbia River. The cumulative effect of pile dikes, flood-control dikes, deepening, jetties, dams, MCR, and spoil disposal have had a significant effect on sediment transport, flow velocity, salinity intrusion, ETM and ecosystem function, and juvenile salmonids. Additional deepening and maintenance dredging will exacerbate the effects of these past and on-going activities. Many scientists have concluded as much and/or have demonstrated that the Corps has gathered insufficient data and analysis upon which to conclude otherwise. Yet, contrary to NEPA, the Corps dismissed these scientific findings without adequate explanation.
- ee.** For example, upstream dams have an effect on the sediment budget and transport. The Corps has

bb. The commenter is incorrect in concluding that the actual dredging depths were not used in the salinity models. Both models used recent Corps channel crossline surveys and a with-project dredging depth of -48 ft mmlw (the proposed navigation depth of 43 ft plus 5 ft for advance maintenance).

Again, contrary to the comment, the Corps' salinity evaluation does address the cumulative effects on salinity of past activities, including past navigation practices. See BA at Sections 2.2.1.5 and 2.3.1.5 (comparing historic salinity distribution in the river, estuary and MCR with existing conditions).

See response to Stakeholder/Special Interest comment SS-259.

cc. While the commenter may disagree with the conclusions of the Corps, NOAA Fisheries, and US Fish and Wildlife Service regarding Project effects on aquatic life, the allegation that the conclusions reflect anything less than full evaluation is not well informed. The Corps, NOAA Fisheries, and the USFWS reached their conclusion that the project would have no significant effects on the Columbia River estuary after a long-term evaluation process, ending with reconsultation under the ESA. The reconsultation process began with the retention of the Sustainable Ecosystem Institute ("SEI") to assist the agencies in framing the scientific issues and providing them with an independent, scientific, peer review of the scientific basis of the project. A Biological Review Team ("BRT") made up of federal representatives (NOAA Fisheries, USFWS and Corps) was formed for the consultation process. The BRT met weekly for approximately 8 months to address biological concerns, and to identify ecosystem restoration features and evaluation actions to further resource recovery and enhance baseline information on ESA salmonids and their habitats. FSEIS at 1-5. The team also reviewed the project's potential effects, including aquatic life effects associated with projected changes in salinity. 2001 BA at 6-1; see also 1999 FEIS at Section 6.2.2.3 and Appendix F. The Corps performed a careful analysis on a suite of analytical data to determine project impacts. This data is listed in the 2001 BA at 13-1. The quantitative data underlying the Corps' conceptual model is listed in the 2001 BA in Appendix E.

In reaching its conclusion, the Corps looked at changes in depth, velocity, and salinity, using two numerical models to assess what level of physical changes would occur from the three-foot channel deepening. The Corps and resource agencies evaluated this information through the BRT. The first model indicated very small changes to the salinity regime. A second, independent salinity model was conducted by the Oregon Graduate Institute, and it confirmed the Corps' modeling results. Based on these findings, the Corps' biologists, relying on their years of experience working directly on the Columbia River and with its species, next determined that these small changes in salinity and hydrodynamics would not cause a significant biological change to the system. As reflected in the 2002 BiOps, NOAA Fisheries and the USFWS concur with the Corps' conclusion regarding salmonids. Similarly, the Oregon and Washington Clean Water Act and CZMA approvals reflect the states' concurrence with the Corps' conclusion regarding other aquatic species, including sturgeon, smelt and crab.

dd. We disagree that there is insufficient data and analysis on which to conclude that the Project will not significantly exacerbate the cumulative effects on sediment transport, flow velocity, salinity intrusion, ETM, ecosystem function and juvenile salmonids. After the NOAA Fisheries Service withdrew its 1999 Biological Opinion because of questions related to many of these topics, the Corps, working collaboratively with the Services, convened a panel of independent scientific experts to determine what the best available science was and to determine whether there was sufficient information on which to make management decisions regarding the Project. The SEI process confirmed that the best available science had been assembled and that there was

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indicated that dams have effectively eliminated sand supply to the coast but the FSEIS does not evaluate the impact of this anthropogenic change on the river, ecosystem, and aquatic life. Another example is the 1983 MCR deepening EIS that projected salinity increases of 10 pp thousand. The Corps has not evaluated whether its projections were accurate and have not analyzed what effect actual changes had on the variety of organisms in the estuary, including those that make up the ETM. The FSEIS has not evaluated the changes in salinity that have occurred to date from a variety of Corps projects.

F. ETM Shift & Organic Content of Flows

- ff. The FSEIS does not evaluate the estimated one-mile upstream shift of the ETM for its potential effect on salmon and other organisms, such as sturgeon. In addition, the ETM could increase pollutant retention due to changes in stratification. Bed stress and suspended sediment concentrations have not been evaluated. Also, not only does the Corps not know what the salinity changes will be, it does not know the effect of an upstream shift in salinity.

The FSEIS does not include any evaluation or consideration to the quality and quantity of organic matter in the freshet versus that present in today's highly managed flows. In theory, a change in sediment input would include a change in fines, making levels of organic matter related to flow. High flows increase the amount of iron upwelling offshore because of previous deposits on the shelf.

IV. Deep Water Site

- gg. The assessment of the Deep Water Site lacks sufficient detail to adequately determine the future impacts of dumping dredged sediments at that location. The Corps' current data consists of side-cast sonar studies and insufficient benthic species population surveys. The most recent side-cast sonar studies were restricted to analyses of the physical and chemical *sediment* compatibility of the dredged materials to the naturally-occurring sediments. This data is insufficient to fully assess the impacts on the aquatic habitat at that site. The Ocean Dumping Act's section 102 regulatory guidelines governing site baseline surveys require the collection of sufficient baseline data to determine the "physical, chemical, geological, and biological structure of the proposed" site. 40 C.F.R. §228.13. The Corps is required to conduct sufficient bottom sampling to determine sediment composition and structure and to determine the nature and numbers of benthic biota. 40 C.F.R. §228.13(e)(1). Benthic biota sampling requires both "quantitative and qualitative evaluation of benthic communities including macroinfauna and macroepifauna, meiobenthos, and microbenthos, and should include an appraisal, based on existing information, of the sensitivity of indigenous species to the waste proposed to be discharged. 40 C.F.R. §228.13(e)(1). Additionally, the "[o]rganisms, shall be sorted, and identified to taxonomic levels necessary to identify dominant organisms, sensitive or indicator organisms, and organism diversity." The

sufficient information to proceed. The reconsultation with the Services, building on the SEI process, reviewed each of the parameters noted in this comment and concluded that the changes were small.

ee. The Corps has not stated that dams have eliminated sand supply to the coast, only that flow regulation resulting from dams has reduced the sand supply to the coast. Further, section 6.12 of the FSEIS specifically reviews pertinent information regarding the Federal Columbia River Power System and its impacts on water quality, sedimentation and sediment transport, sediment quality, aquatic and wildlife resources and threatened and endangered species as part of the cumulative effects analysis.

Again, contrary to the comment, the Corps' salinity evaluation does address the cumulative effects on salinity of past activities, including past navigation practices. See BA at Sections 2.2.1.5 and 2.3.1.5 (comparing historic salinity distribution in the river, estuary and MCR with existing conditions). Further, under the Project's Monitoring Action 1, the Corps is funding 3 CORIE hydraulic monitoring stations to collect continuous real-time data on salinity and other parameters as described in the BiOp Implementation Plan. See <https://www.nwp.usace.army.mil/issues/crcip/implementation.htm> at Term and Condition 3a.

ff. The FSEIS does address the effects of the potential ETM shift. See Section 6.2.2.3; see also FEIS at Section 6.2.2.3 and Exhibit F. In the Columbia River, as in other large rivers, tidal processes and river flow result in a zone of increased turbidity, the Estuarine Turbidity Maximum (ETM). The turbidity in the ETM is the combination of both the concentration of suspended organic matter and the resuspension of organic and inorganic matter from the bottom. The length of the ETM is typically 0.6 to 3 miles. The position of the ETM in the Columbia River ranges between RM 9 and 18, from Youngs Bay to Tongue Point (Simenstad, 1994). 2001 BA at 6-19. Salmonids benefit from the distribution of nutrients out of the ETM. See 2001 BA at 6-18. Tidal forcing processes that influence salinity intrusion into the estuary effect the location of the ETM. Consequently, it was important to determine the change to the salinity profile as a result of project modification, which affects where the ETM is located.

The Corps quantitatively analyzed the effects of the project on salinity, and found it to be small. This result was independently verified with a second modeling effort that was presented to the SEI panel, and the panel agreed with the physical modeling efforts. See 2001 BA at 6-18; SEI Meeting Minutes, August 28-29, 2001. This modeling demonstrated that changes to the salinity regime were small. See 2001 BA at 6-20. This small impact on salinity intrusion, which effects the location of the ETM, was determined to be insignificant. Id. Finally, the Corps is required under the terms and conditions of the 2002 Biological Opinions to conduct a workshop on ETM to be held in conjunction with the detailed analysis of the Anadromous Fish Evaluation Program habitat data that will be collected in monitoring action MA-4. This information will improve the knowledge base regarding the ETM and the potential ETM shift and support the Adaptive Management Process. See, e.g., NOAA Fisheries BiOp at Term and Condition 3g; see also <https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>.

gg. Contrary to the comment, the FEIS and FSEIS contain ample information on the current physical and biological conditions at the Deep Water Site from which to evaluate potential impacts under NEPA and the MPRSA. The 1999 FEIS included extensive technical exhibits (A through H) to Appendix H, Volume I: Ocean Dredged Material Disposal Sites Main Report and Technical Exhibits that detail the physical, chemical, geological and biological information at the Deep Water Site and its surrounding environment. Exhibit H (Management/Monitoring Plan) discusses further baseline, routine, and special studies that were deemed necessary by EPA and the Corps. This included the need for baseline studies including biological studies at the Deep Water Site (Exhibit H, pp. H-4&5). Subsequently additional studies have been conducted and are

presented in the FSEIS at Volume 3, Exhibit N. These studies include a Sediment Trend Analysis in which over 1200 sediment samples were collected for physical characterization. A Physical and Chemical Sediment Characterization Baseline Study, in which 10 of the stations within the Deep Water Site sampled in the Sediment Trend Analysis were subjected to additional physical as well as chemical analysis, was completed at the DWS. An acoustical Physical Baseline Study Seafloor Mapping Study involving sidescan sonar and RoxAnn seabed sediment hardness and sediment texture, or topographic roughness survey was also conducted. Also included in Exhibit N is a presentation of preliminary results of biological studies at the Deep Water Site. These studies were completed in 2002 and are presented in a final report entitled Environmental Studies at Proposed Ocean Disposal Sites off the Mouth of the Columbia River, dated June 2003.

The regulations (40 CFR Subchapter H-Ocean Dumping) implementing the MPRSA establish the criteria for the dumping of all material in the ocean, including both waste as well as dredged material. See 40 CFR 220.2(d) (definition of “material”).

Dredged materials are bottom sediments or materials that have been dredged or excavated from the navigable waters of the United States, and their disposal into ocean waters is regulated by the U.S. Army Corps of Engineers using the criteria of applicable sections of [40 CFR] parts 227 and 228.

40 CFR 227.13(a). Dredged material itself is not considered a waste and therefore is not regulated as such. Accordingly, only certain portions of parts 227 and 228 apply to ocean disposal of dredged material. See 40 CFR 227.1(b) (identifying specific sections of Part 227 – Criteria for the Evaluation of Permit Applications for Ocean Dumping of Materials – that are applicable to dredged material as opposed to other material). The applicability of Part 228-Criteria for the Management of Disposal Sites for Ocean Dumping –to dredged material disposal is as follows:

The criteria of this Part 228 are established pursuant to Section 102 of the Act and apply to the evaluation of proposed ocean dumping under Title I of the Act. The criteria of this Part 228 deal with the evaluation of the proposed dumping of material in ocean waters in relation to continuing requirements of effective management of ocean disposal sites to prevent unreasonable degradation of the marine environment from all wastes being dumped in the ocean. This Part 228 is applicable to dredged material disposal sites only as specified in §§228.4 (e), 228.9, and 228.12.

40 CFR 228.1 (emphasis added).

As indicated in the applicability section quoted above, the regulatory section cited repeatedly in the comment, 40 CFR 228.13, does not apply to the disposal of dredged material.

The Corps disagrees with NWEA that “the scope of the proposed project – including rate, amount, and timing of disposal -- has been defined with such vague parameters that the studies so far completed are meaningless.” Appendix H to the FEIS, and in particular Exhibit B, Physical Processes and Geological Recourses, presents detailed discussion and quantification of past, present, and future project dredging and disposal needs as it relates to the need for ocean disposal of dredged material. In addition, the FSEIS contains new information on the volumes of material to be disposed, including materials to be disposed in the ocean. See FSEIS at Section 4.4.3.10.

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detailed benthic infauna data provided by the Corps in the FSEIS is insufficient to meet the required criteria established under the regulations. Additionally, the scope of the proposed project -- including rate, amount, and timing of disposal -- has been defined with such vague parameters that the studies so far completed are meaningless.

- hh.** The Corps' data and assessment of the impact of dumping larger grained sediments on benthic species at the Deep Water Site is insufficient under the regulatory guidelines. There is agreement among the Corps, State agencies, or stakeholders that crabs covered by disposed sediments are unable to dig out of the sediments and will be expected to die. The degree of destruction of crab and other benthic habitat remains unknown and insufficiently investigated. The Corps originally concluded that the impact was thoroughly studied based on the pilot crab burial study, "*Effects of Sand Accumulation of Juvenile Flatfish and Soft-shelled Dungeness Crab*." When the Oregon Department of Fish and Wildlife (ODFW) characterized the Corps' conclusion as "blatantly false," the Corps responded that its conclusion was additionally based on the "Federal Government's national experience with other bottom feeding species (e.g. lobster, blue crab)." (S-20) The details, sources, and location of this "national experience" data remains unknown and appear speculative at best. Clearly, this conclusion is unsupported by the biological baseline studies and is insufficient to meet federal requirements for both site designation and NEPA. This proposal specifically requires additional baseline data, as well as additional testing and analysis of that data, for the benthic infauna and habitat for this site. Dungeness crabs are an essential part of the food chain in the areas surrounding the ocean disposal sites. Continual degradation of crab habitat will have further negative impacts on other species in the region. The Corps is incapable of predicting measurable effects of reduced aquatic species habitat because inadequate data have been compiled.
- ii.** Furthermore, the Corps has failed to assess the full impact of the Deep Water Site, as well as the cumulative effects of all the ocean sites. The Corps' statement that the Deep Water Site will have minimal impact is conclusory and lacks adequate support, particularly since the Corps fails to provide detailed information on the amount, rate, and timing of disposal. The Corps vaguely proposes "avoidance and minimization" as the only parameters on its use of the deep water site. The regulations require an analysis of the types and quantities of waste proposed for site disposal, including the "existence and effects of current and previous discharges and dumping in the area (including cumulative effects)." 40 C.F.R. § 228.6(a)(4) and (7).
- jj.** The Corps concluded, without any data on rate, amount, or timing of material disposal, that the destruction of benthic species will be insignificant because benthic species, particularly crabs, are widely distributed along the coastal areas beyond the dumping sites. The Corps' conclusions are not based on any estimated dumping rate, quantity, or time estimates or the cumulative effects of other dumping sites and overall degradation on the benthic species and habitat resulting from those sites. The Corps has failed to provide data clarifying the range and numbers of species in

hh. To the extent this comment relies on the requirements of 40 CFR 228.13, as discussed above, that section does not apply to the disposal of dredged material.

The Corps and EPA disagree that crab are "unable to dig out of the sediments and will be expected to die." The Corps' responses to comments on the Draft SEIS address in detail issues related to the study on crab burial. See response to Draft SEIS comments S-20 and S-124 at FSEIS, Volume 4, p. State-14 and State-64. Response S-20 acknowledges that disposal at the Deep Water Site has the potential to impact crab and other benthic organisms by direct and indirect mechanisms. However, as discussed in the FEIS, FSEIS, and responses to comments, the Corps and EPA have concluded that ocean disposal will not significantly affect crab populations in the Washington and Oregon region around the Columbia River, and therefore is not anticipated to have a significant impact on the food chain in this area.

The Corps and EPA also disagree with NWEA that the existing "biological baseline studies are insufficient to meet the federal requirements for both site designation and NEPA." The requirement for dredged material disposal site baseline studies is established by §228.4(e)(1)(i). As detailed above, appropriate baseline data has been collected and analyzed to proceed with site designation and to meet MPRSA and NEPA requirements. This data can be found in the appendices to the 1999 IFR/FEIS and 2003 FSIFR/EIS and the 2003 report entitled Environmental Studies at Proposed Ocean Disposal Sites Off the Mouth of the Columbia River. In addition to the existing baseline studies various special studies and monitoring surveys are ongoing, some of which are specifically related to crab. See also response to Draft SEIS comments S-18 at FSEIS, Volume 4, p. State-13 regarding the adequacy of *baseline information*.

ii. The Corps and EPA disagree with NWEA's statement that the impact of using the Deep Water Site is not adequately addressed in the FEIS and FSEIS. Title I of the MPRSA requires the Corps and EPA to develop and implement regulatory programs to insure that ocean disposal would not "...unreasonably degrade or endanger human healthy, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." 33 USC 1413(a). 40 CFR §228.4(e)(1)(ii) allows for environmental assessments to be based upon site designation or evaluation studies on a typical site or sites in the area. As discussed above, Appendix H of the FEIS and the subsequent environmental studies conducted at the DWS and other sites in the area meet these requirements. Further the Corps and EPA disagrees that the cumulative effects for all ocean sites have not been addressed. Past disposal and future disposal needs are presented in Appendix H, with disposal amounts presented in Table 1 in the main text and detailed information presented in Exhibit B, including amounts, rate, and typical timing of disposal (see FEIS at Appendix H, Exhibit H, Table B-1, B-2, and B-3).

See also response to Draft SEIS comments SS-64, 67, 71 and 72 at FSEIS, Volume 4, p. Stakeholders/Special Interests-29, 30 and 31.

jj. Rate, amount, and timing of dredged material disposal is thoroughly discussed in the FEIS, Appendix H, main text (see table 1 Estimated Ocean Disposal Volumes) and in particular detail in Exhibit B to Appendix H, Physical Processes and Geological Resources. As noted above, additional information on disposal volumes associated with the Channel Improvement Project, including potential ocean disposal volumes, are presented in the FSEIS. Numerous studies have been conducted assessing the impact of dredged material disposal on the benthic community off the mouth of the Columbia River. These are presented in the FEIS, Exhibit A to Appendix H, Living Resources. Subsequent studies are provided in Exhibit N of the FSEIS and the June 2003 report entitled Environmental Studies at Proposed Ocean Disposal Sites off the Mouth of the Columbia River. While the Corps and EPA acknowledge that there will be impacts in the area of disposal due to direct burial of benthic infauna, studies have shown rapid recolonization. The proposed sites are so designed that there will be no unacceptable environmental impacts as described in 40 CFR 227.4. Indeed studies show that, even at the point of disposal, impacts are transitory, limited, and acceptable.

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the site and in the surrounding areas. The Corps' conclusory statements lack supporting data and are further evidence the lack of research that the Corps has completed in properly assessing impact. The regulatory authority specifically requires that dredged materials must be limited to prevent long-term damage to the environment or to amenities. Without determining and analyzing the proposed amount of dredged materials for the sites, a reasonably reliable evaluation of the complete impact on marine ecosystem cannot be completed. Clearly, these speculative and conclusory statements make it impossible to evaluate whether the impact will be persistent, permanent, or otherwise unacceptable. 40 C.F.R. §227.4. Ironically, the Corps acknowledged that additional burial tests are needed to determine the real extent of the impact of dumping on the benthic species, and it agreed that further testing of the impact of burial will occur "this year if funds are available." The Corps disregarded as insignificant the need for further baseline data because, as it claimed, use of the Deep Water Site is not expected for twenty years. However, the Corps failed to assess the cumulative impact and effects of the segmented MCR proposal for dumping in the Deep Water Site. The Corps presently seeks permanent designation of the Deep Water Site for immediate disposal of MCR dredge materials as needed. Additionally, the Corps has stated that if other disposal sites are not approved, the Corps will consider dumping the channel dredged materials in the permanent §102 designated ocean sites. This aspect of the FSEIS proposal presumably would include the Deep Water Site since it is not specifically excluded by the Corps. The Corps has improperly segmented the use of the Deep Water Site for the MCR project from the channel deepening project; yet, the Corps leaves open the option to dump dredged materials, at its discretion, from either the MCR project or the channel deepening project.

- kk.** Furthermore, in gathering and assessing baseline data, the Corps has failed to integrate any State, local, and stakeholder contributions to its data and assessment. As the record shows, the Corps completely disregarded the concerns and contributions offered by the Ocean Disposal Task Force, which is composed of the State agencies and stakeholders and which was formed to facilitate cooperative planning, management, and monitoring of ocean disposal. In response to complaints and without any explanation to the public or the Task Force members, the Corps simply states that it is re-evaluating the Task Force. The Corps has thereby blocked any additional input or analysis of baseline data. Yet, the Corps has acknowledged the lack of baseline data and the speculative nature of the benthic data collected for the ocean sites. In its most recent response to ODFW's concerns, summarized in S-18: the Corps has stated that "the biological information presently being gathered, along with the previous biological information... is expected to establish an adequate baseline for monitoring and management of the ocean disposal sites selected to be proposed for designation." The Corps devalues the significance of monitoring and management criteria and baseline data for this designation proposal; the Corps states that there is no need to presently evaluate that data because sufficient minimum data has been provided to meet the regulatory and statutory requirements. The Corps similarly dismisses the need for any mitigation strategy because, as it claims, "this small area of the ocean is not likely to translate into

The Corps and EPA also disagree with the NWEA statement about the Corps' disregard for the "need for further baseline data" at the Deep Water Site. Appendix H, Exhibit H, states "The EPA and COE acknowledge the need for biological data," Exhibit H, page H-4. Further, under "Baseline Studies," Exhibit H specifically states; "There is only limited information on biological resources of the Deep Water Site. Additional baseline studies will be needed to characterize the Deep Water Site." Exhibit H, page H-5. The EPA and Corps have conducted additional studies (see above). Further EPA in its draft proposed rule implemented use restrictions pending studies conducted per the SMMP. 68 Fed. Reg. 11488 (March 11, 2003).

The EPA and Corps strongly disagree with NWEA that the "Corps has improperly segmented the use of the Deep Water Site for the MCR project from the channel deepening project." The FEIS, at Appendix H (Columbia River Ocean Dredged Material Disposal Sites), clearly states in its very first paragraph (PURPOSE) that the FEIS "and especially this appendix proposes for final designation by EPA two ODMDSs needed for long-term use by the authorized Columbia River navigation projects. These federally-authorized navigation projects include maintenance of the 5 mile long [river mile (RM) +3 to RM -2] Mouth of the Columbia River (MCR) project; maintenance of the existing 40-foot navigation channel (RM +3 to Portland) as described in the final Dredged Material Management Plan and Supplemental Environmental Impact Statement (USACE, 1998); and the potential construction and maintenance of the proposed navigation channel improvements as described in the [FEIS]. The ODMDSs also would be available for material dredged from non-Corps dredging projects by obtaining the appropriate permits through the Corps' Regulatory program." FEIS, Appendix H, p. H-1. Further Exhibit H to Appendix H, under "Anticipated Site Use" for both the MCR and Columbia River federal project states; "The 7 mcy dredged during construction of the deepening project, if authorized, would be placed into the Deep Water Site. To minimize conflicts, and to limit the area impacted, the plan is to point dump it in the southwest corner of the site. This quantity would cover an area approximately 0.54 square miles." Exhibit H, page H-21. With regard to the MCR project itself the preference is clearly stated that the North Jetty Site (a CWA 404 site) and the Shallow Water Site (a.k.a Site E or Expanded Site E) would be used first. Once those sites reach capacity, material would be placed in limited areas by point dumping in the Deep Water Site. Exhibit H, page H-21. The ODMDSs could also be used for placement of material dredged during actions authorized in accordance with Section 103 of the MPRSA. These actions would require a Section 103 permit from the Corps, concurrence from EPA, and be coordinated through the public notice process. Placement of material in the Deep Water Site has consistently been identified as the last option. The FSEIS did explore the potential for ecosystem restoration projects to beneficially use material to be dredged from the improvement project and longterm maintenance dredging. However, because use of these beneficial use sites is effectively not practicable (Lois Island site) or is prohibited (Miller-Pillar site) under the terms of the State of Oregon's Section 401 water quality certification, these materials will be disposed in the ocean in accordance with EPA's SMMP.

kk. The EPA and Corps disagree with NWEA's statement regarding the failure to intergrate State, local, and stakeholder contributions. The FEIS, Appendix H, Volume II and III, contain a record of the efforts made to integrate these sources into the evaluation process. The site selection process is described in the main report text of Appendix H starting with a discussion of the Ocean Dumping Site Designation Process, through Determination of Compliance and Selection for Formal Designation, and ending with Selection of Ocean Disposal Site for Formal Designation. The section Further Consideration and Refinements addresses particularly the EPA's and Corps' efforts to address the concerns raised during the site selection process by various stakeholder groups. The final location and configuration of the DWS was a direct result of the integration of State, local and stakeholder input during the site selection process. The response to comments S-13, which is at FSEIS, Volume 4, page S-10, and response S-30, page S-17, address issues regarding the ocean task force.

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measurable effects.” The Corps has merely suggested that it will continue collecting data in the future. The Corps’ past record is replete with vague declarations of the need for future studies of benthic species; however, little data has been accumulated. Additionally, the Corps diminishes the need for immediate deep water site management, monitoring, or mitigation because, as the Corps claims, the Deep Water Site will only be used for channel deepening dredge materials twenty years in the future. However, since this proposal is connected to past and interim ocean dredging actions, monitoring and management baseline data for the existing ocean dumping sites is necessary to determine and evaluate the cumulative effects of disposing of dredged materials in the Deep Water Site. In addition, even if the Corps speculative use of the Deep Water Site is not for another 20 years, that fact does not negate meeting legal requirements now.

- II. Pursuant to 40 C.F.R. §228.6, the Corps must consider the full panoply of criteria in its environmental assessment and EIS of the impact of dumping materials at its proposed ocean site. The criteria include:

- 1) Geographical position, depth of water, bottom topography and distance from coast;
- 2) Location in relation to breeding, spawning, nursery, feeding, or passage areas of living resources in adult or juvenile phases;
- 3) Location in relation to beaches or other amenity areas;
- 4) Types and quantities of wastes proposed to be disposed of, and proposed methods of release, including methods of packing the waste, if any;
- 5) Feasibility of surveillance and monitoring;
- 6) Dispersal, horizontal transport and vertical mixing characteristics of the area, including prevailing current direction and velocity, if any;
- 7) Existence and effects of current and previous discharges and dumping in the area (including cumulative effects);
- 8) Interference with shipping, fishing, recreational, mineral extraction, desalination, fish and shellfish culture, areas of special scientific importance and other legitimate uses of the ocean;
- 9) The existing water quality and ecology of the site as determined by available data or by trend assessment or baseline surveys;
- 10) Potentiality for the development or recruitment of nuisance species in the disposal site; and
- 11) Existence at or in close proximity to the site of any significant natural or cultural features of historical importance.

An evaluation of these criteria are required for the cumulative effects of use of the site for disposal from the MCR project and the channel deepening project; the cumulative effects of the sites in the area; and the cumulative effects of the past and current use of the sites in the area.

With regard to baseline data for designation, as discussed above, the EPA and Corps respond that sufficient baseline data has been collected and analyzed for EPA to proceed with final site designation of the DWS and SWS. This data is presented in Appendix H to the 1999 FEIS, Exhibit N of the 2003 FSEIS, and the 2003 final report Environmental Studies at Proposed Ocean Disposal Sites off the Mouth of the Columbia River. Further studies will be conducted in accordance with EPA’s site designation documents and SMMP.

Mitigation for impacts at the ocean disposal sites was addressed through the consideration and selection of site alternatives. The locations of the sites considered for proposal as EPA designated 102 sites are based on minimizing impacts to the marine environment and fisheries.

The primary use of the DWS is for material dredged from the MCR project as described in Appendix H. Material will also come from the CRCIP because, as noted above, estuarine ecosystem restoration beneficial use sites are effectively not practicable or prohibited under the State of Oregon’s conditions. Management and monitoring of the site will be in accordance with EPA’s site designation documents including the (SMMP. As part on the SMMP annual monitoring is required. Typically this consists of bathymetric surveys to document the behavior of placed material as a tier 1 monitoring activity. Other monitoring tiers, special studies as described in Exhibit H of Appendix H, or EPA’s site designation documents or subsequent EPA management requirements will be conducted as required by the MPRSA.

II. The “proposed ocean site(s)” off the MCR are proposed for final site designation by EPA. The Corps does not have the authority to designate sites. As part of the site designation process EPA has considered the “full panoply” of eleven specific criteria (40 CFR 228.6) and five general criteria (40 CFR 228.5). NWEA lists only the 11 specific criteria in their comment. A discussion of each of the 5 general and 11 specific factors is contained in Appendix H for the proposed sites. In addition Table 14 and Table 15 present in matrix format 27 Areas of Consideration as related to the 5 general and 11 specific criteria. See response to Draft SEIS comments SS-33, 38, 39 and 41-47 at FSEIS, Volume 4, p. Stakeholder/Special Interest-18 through 22.

Item #27, “Potential for Cumulative Effects,” in Appendix H, Tables 14 and 15 (Conflict Matrix) lists the relevant specific criteria (4 and 7) and general criteria (c and d) that must be addressed as part of the site evaluation, selection, and designation process. These criteria are addressed in detail in the text.

Finally, as discussed above, the EPA and Corps have not “effectively segmented” the analysis. Appendix H specifically discusses the placement of dredged material at the disposal sites from the MCR project as well as the CRCIP and potential impacts to species and habitat.

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The Corps has effectively segmented its analysis of the Deep Water Site from other cumulative effects of disposal site use. The Corps' vague statements about the Deep Water Site effectively leave all decisions and determinations about the site to its future discretion without any real consideration of the impact to species and habitat in the assessment before the Deep Water Site is permanently designated.

- mm.** The regulations also prohibit dumping waste in a manner that presents an unacceptable danger to the shorelines and the nearby beaches. 40 C.F.R. §227.10. One criteria for assessing the impact of ocean dumping includes potential for affecting recreational use and values of ocean waters, inshore waters, beaches, or shorelines. Additionally, the need for dumping the dredged materials in the Deep Water Site must be assessed relative to the irreversible and irretrievable consequences resulting from that disposal. 40 C.F.R. §227.15. In light of these criteria, consequences, and costs, the feasibility of alternatives must be evaluated. 40 C.F.R. §227.15. The regulations specifically suggest preferred alternatives including using the materials as "landfill" or by "spreading the material over the ground." 40 C.F.R. §227.15. The Corps has not adequately addressed either the long-term or cumulative effects that the dredging and disposal projects are having on the coastal erosion problems. The Corps recognizes the beneficial use and need for beach fill along the coasts. The sediment starvation along those beaches and coastlines is a direct result of the dredge and disposal projects by the Corps in the Columbia River channel. Washington State Department of Fish and Wildlife has specifically requested that the Corps consider the continuing and unacceptable danger to the shorelines and beaches. However, the Corps merely acknowledges the need for future analysis. The Corps has not given any immediate consideration of the real costs resulting from this degradation. The cumulative impact of disposing of sand in the deep water site will result in its permanent waste because it will be irretrievably lost. As stated by the Washington State Department of Fish and Wildlife, the sand should not be wasted in the deep water because it exacerbates the costs, already "nearly 100 million dollars," from erosion, habitat loss, and degraded coastal infrastructure. These costs, which continue to place harmful and unnecessary stress on coastal fish, wildlife, and human populations, are due to the on-going sediment starvation caused by the Corps' dredge and disposal methods. Ocean dumping is simply prohibited unless the Corps demonstrates that the absence of "practicable alternative locations and methods of disposal or recycling" that have less adverse impact or and less potential risk to the environment. 40 C.F.R. §227.16. In evaluating the practicable alternatives, the EPA and the Corps must take into account all "environmental benefits derived from" the alternatives, as well as the true costs of coastal degradation resulting from ocean dumping.

Conclusion

As it is our belief that the Corps has not adequately and satisfactorily responded to many of our September 15, 2002 comments submitted on the Draft Supplemental EIS, we hereby incorporate

mm. NWEA has misused the term "waste" for "dredged material" with regard to interpreting the applicability of 40 CFR §§227.10, 227.15, and 227.16. Dredged material is not a "waste." As defined by 40 CFR §227.13 (a) "Dredged materials are bottom sediments or material that have been dredged or excavated from the navigable waters of the United States." Some factors such as a §227.15 (2) Well injection, or §227.15 (3) Incineration, clearly do not apply to dredged material. However, the determination of compliance and selection for formal designation was performed in accordance with applicable sections of 40 CFR §277 as documented in the FEIS at Appendix H (see Determination of Compliance and Selection for Formal Designation).

The EPA and Corps disagree with NWEA that the FEIS and FSEIS do not address "the long-term or cumulative effects that the dredging and disposal projects are having on the coastal erosion problems." See response to comment III.B above, FSEIS at Section 6.12 and Exhibit J. As discussed in these materials, the Project is not expected to contribute to coastal erosion and the EPA and the Corps disagree with the comment that "sediment starvation along the[] beaches and coastlines [of Washington] is a direct result of dredge and disposal projects by the Corps in the Columbia River channel." In addition, the FSEIS identifies specific monitoring measures to assess accretion and erosion. Further, the Washington 401 certification includes conditions to address unanticipated effects. Finally, EPA and the Corps tried to select areas for designation in 30 to 60 feet of water both north and south of the MCR that would have placed sand in the littoral system. In response to comments from the Taskforce and concern over impacts to the crab fishing industry the EPA and Corps proceeded to look for a Deep Water Site near candidate site 8.

As stated in the FEIS, Appendix H, the EPA and Corps fully support the concept of nearshore placement of dredged material. The EPA and Corp view dredged material as a valuable resource and feel that keeping material in the littoral zone is beneficial. The designation and intended use of the Shallow Water Site at MCR along with the North Jetty Site as the primary repository for dredged material attests to the Corps' and EPA's desire and effort to use dredged material beneficially by enriching the littoral zone along the southern coast of Washington. It should be noted however, that the erosion of the southern coast of Washington is a result of natural processes of wind, wave, and current. While it is the intent to place most if not all of the material dredged from the MCR and perhaps other projects in these nearshore shallow sites this will have little impact to the overall natural process along the south coast of Washington. In addition the SWS and NJS must be carefully managed to ensure areas do not potentially contribute to adverse navigation conditions that naturally exist in this area of the coast.

Alternatives to ocean disposal considered included no action, upland/beach disposal, and estuarine disposal. The estuarine disposal alternatives included two ecosystem restoration features that would have provided beneficial habitat to listed salmonid species. Unfortunately these features are effectively not practicable or are prohibited under the State of Oregon's conditions. Alternatives considered under ocean disposal included disposal off the continental shelf, continued use of existing sites, and designation of new ocean disposal sites. Discussions of all these alternatives are presented in the FEIS, Appendix H, in the section "Overview of Disposal Options." This record demonstrates a thorough review of alternatives to ocean disposal. Conditions in the Washington 401 certifications for the MCR and Channel Improvement Project require the Corps to continue evaluating the availability of sites that might beneficially use the dredged material.

Robert E. Willis
March 3, 2003
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those by reference. Likewise, we incorporate by reference those portions of comments submitted by Washington Department of Ecology, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, and Oregon Department of Geology and Minerals (DOGAMI) on the DSEIS that pertain to issues regarding sand transport, sedimentation, coastal erosion, aquatic life, and the Deep Water Site. We disagree with the Corps' belief, stated in the FSEIS response to comments, that its citations to the 2001 SEI process and 2002 Biological Opinions issued by the National Marine Fisheries and U.S. Fish and Wildlife Services are sufficient evidence of compliance with the requirements of NEPA. Neither of those processes developed new data, reliable modeling results, or the type of intensive scientific analysis required for this project. In particular, they consist primarily of the opinions and, in some cases, the mere feelings, of the participants. In addition, evaluations done in those contexts are themselves highly flawed because they failed to consider the baseline effects of various human activities in the action area that have affected such physical and biological attributes as temperature, toxics, sedimentation, salinity, and the ETM. The Corps cannot rely on the SEI panel and Services when those entities fundamentally misunderstand and misapply federal law. Moreover, it is particularly ironic that the Corps seeks to rely on these other agencies and processes yet then declines to, as it states repeatedly in its response to public comments, "respond to comments that are actually directed to the Biological Opinions prepared" by other agencies. Finally, we disagree that the Corps has adequately evaluated the effects of channel maintenance in the 1998 Dredged Material Management Study and Supplemental Environmental Impact Statement (DMMS). The DMMS is as devoid of data, analysis, and substance as the FSEIS for the channel deepening project, if not more so.

Sincerely,



Nina Bell
Executive Director